
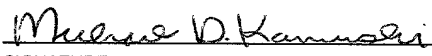


JC13 Rec'd PCT/PTO 27 MAR 2002

FORM PTO-1390 (Modified) (REV 5-93)		U S DEPARTMENT OF COMMERCE PATENT AND TRADEMARK OFFICE		ATTORNEY'S DOCKET NUMBER	
TRANSMITTAL LETTER TO THE UNITED STATES DESIGNATED/ELECTED OFFICE (DO/EO/US) CONCERNING A FILING UNDER 35 U.S.C. 371				053694-0113	
		U.S. APPLICATION NO. (If known, see 37 C.F.R. 1.55)		Unassigned 10/088493	
INTERNATIONAL APPLICATION NO. PCT/GB00/03607		INTERNATIONAL FILING DATE 20 September 2000		PRIORITY DATE CLAIMED 29 September 1999	
TITLE OF INVENTION FILTER ASSEMBLY WITH DRAIN OUTLET					
APPLICANT(S) FOR DO/EO/US Robert Stephen MULES					
Applicant herewith submits to the United States Designated/Elected Office (DO/EO/US) the following items and other information:					
1.	<input checked="" type="checkbox"/>	This is a FIRST submission of items concerning a filing under 35 U.S.C. 371.			
2.	<input type="checkbox"/>	This is a SECOND or SUBSEQUENT submission of items concerning a filing under 35 U.S.C. 371.			
3.	<input type="checkbox"/>	This express request to begin national examination procedures (35 U.S.C. 371(f)) at any time rather than delay examination until the expiration of the applicable time limit set in 35 U.S.C. 371(b) and PCT Articles 22 and 39(1).			
4.	<input checked="" type="checkbox"/>	A proper Demand for International Preliminary Examination was made by the 19 <sup>th</sup> month from the earliest claimed priority date.			
5.	<input checked="" type="checkbox"/>	A copy of the International Application as filed (35 U.S.C. 371(c)(2))			
	<input type="checkbox"/>	is transmitted herewith (required only if not transmitted by the International Bureau).			
	<input checked="" type="checkbox"/>	has been transmitted by the International Bureau.			
	<input type="checkbox"/>	is not required, as the application was filed in the United States Receiving Office (RO/US)			
6.	<input type="checkbox"/>	A translation of the International Application into English (35 U.S.C. 371(c)(2)).			
7.	<input checked="" type="checkbox"/>	Amendments to the claims of the International Application under PCT Article 19 (35 U.S.C. 371(c)(3))			
	<input type="checkbox"/>	are transmitted herewith (required only if not transmitted by the International Bureau).			
	<input type="checkbox"/>	have been transmitted by the International Bureau.			
	<input type="checkbox"/>	have not been made; however, the time limit for making such amendments has NOT expired.			
	<input checked="" type="checkbox"/>	have not been made and will not be made.			
8.	<input type="checkbox"/>	A translation of the amendments to the claims under PCT Article 19 (35 U.S.C. 371(c)(3)).			
9.	<input checked="" type="checkbox"/>	An oath or declaration of the inventor(s) (35 U.S.C. 371(c)(4)).			
10.	<input type="checkbox"/>	A translation of the annexes to the International Preliminary Examination Report under PCT Article 36 (35 U.S.C. 371(c)(5)).			
11.	<input checked="" type="checkbox"/>	Applicant claims small entity status under 37 CFR 1.27 .			
Items 12. to 17. below concern other document(s) or information included:					
12.	<input checked="" type="checkbox"/>	An Information Disclosure Statement under 37 CFR 1.97 and 1.98.			
13.	<input checked="" type="checkbox"/>	An assignment document for recording. A separate cover sheet in compliance with 37 CFR 3.28 and 3.31 is included.			
14.	<input checked="" type="checkbox"/>	A FIRST preliminary amendment.			
	<input type="checkbox"/>	A SECOND or SUBSEQUENT preliminary amendment.			
15.	<input type="checkbox"/>	A substitute specification.			
16.	<input type="checkbox"/>	A change of power of attorney and/or address letter.			
17.	<input checked="" type="checkbox"/>	Other items or information: Application Data Sheet (3 pages)			

2013 Fee PCT/PTO 27 MAR 2002

U.S. APPLICATION NO. (If known, see 37 CFR 1.55) Unassigned <b>10/088493</b>		INTERNATIONAL APPLICATION NO. PCT/GB/00/03607		ATTORNEY'S DOCKET NUMBER 053694-0113	
18. <input checked="" type="checkbox"/> The following fees are submitted:				CALCULATIONS	
Basic National Fee (37 CFR 1.492(a)(1)-(5): Search Report has been prepared by the EPO or JPO.....\$890.00					
International preliminary examination fee paid to USPTO (37 CFR 1.482).....\$710.00					
No international preliminary examination fee paid to USPTO (37 CFR 1.482) but international search fee paid to USPTO (37 CFR 1.445(a)(2)) .....\$740.00					
Neither international preliminary examination fee (37 CFR 1.482) nor International search fee (37 CFR 1.445(a)(2)) paid to USPTO ..... \$1,040.00					
International preliminary examination fee paid to USPTO (37 CFR 1.482) and all claims satisfied provisions of PCT Article 33(2)-(4) .....\$100.00					
ENTER APPROPRIATE BASIC FEE AMOUNT =				\$890.00	
Surcharge of \$130.00 for furnishing the oath or declaration later than 20 Months from the earliest claimed priority date (37 CFR 1.492(e))					
Claims	Number Filed	Included in Basic Fee	Extra Claims	Rate	
Total Claims	11	-	20	=	0 x \$18.00
Independent Claims	1	-	3	=	0 x \$84.00
Multiple dependent claim(s) (if applicable)				\$280.00	
TOTAL OF ABOVE CALCULATIONS =				\$890.00	
Reduction by 1/2 for filing by small entity, if applicable.				\$445.00	
SUBTOTAL =				\$445.00	
Processing fee of \$130.00 for furnishing English translation later the 20 months from the earliest claimed priority date (37 CFR 1.492(f)).				+	
TOTAL NATIONAL FEE =				\$445.00	
Fee for recording the enclosed assignment (37 CFR 1.21(h)). The assignment must be accompanied by an appropriate cover sheet (37 CFR 3.28, 3.31). \$40.00 per property +				\$40.00	
TOTAL FEES ENCLOSED =				\$485.00	
				Amount to be: refunded \$	
				charged \$	
<p>a. <input checked="" type="checkbox"/> A check in the amount of \$485.00 to cover the above fees is enclosed.</p> <p>b. <input type="checkbox"/> Please charge my Deposit Account No. <u>19-0741</u> in the amount of \$0.00 to the above fees. A duplicate copy of this sheet is enclosed.</p> <p>c. <input checked="" type="checkbox"/> The Commissioner is hereby authorized to charge any additional fees which may be required, or credit any overpayment to Deposit Account No. <u>19-0741</u>. A duplicate copy of this sheet is enclosed.</p>					
NOTE: Where an appropriate time limit under 37 CFR 1.494 or 1.495 has not been met, a petition to revive (37 CFR 1.137(a) or (b)) must be filed and granted to restore the application to pending status.					
SEND ALL CORRESPONDENCE TO:					
Foley & Lardner Customer Number: 22428  <b>22428</b> PATENT TRADEMARK OFFICE			 SIGNATURE  NAME MICHAEL D. KAMINSKI  REGISTRATION NUMBER 32,904		

***IN THE UNITED STATES PATENT AND TRADEMARK OFFICE***

Applicant: Robert Stephen MULES  
Title: FILTER ASSEMBLY WITH DRAIN  
OUTLET  
Appl. No.: Unassigned  
Filing Date: 03/27/2002  
Examiner: Unassigned  
Art Unit: Unassigned

**PRELIMINARY AMENDMENT**

Commissioner for Patents  
Box PCT  
Washington, D.C. 20231

Sir:

Prior to examination of the above-identified application, Applicant respectfully requests that the above-identified application be amended as follows:

**In the Claims:**

In accordance with 37 C.F.R. §1.21, please substitute for claims 3, 5, 7, 10 and 11, the following rewritten version of the same claims, as amended. The changes are show explicitly in the attached "Marked-up Version of Amended Claims."

3. (Once Amended) A fluid filter assembly according to claim 1, wherein the housing comprises a base and a removable cap fitted together, the drain outlet being formed in the base.

5. (Once Amended) A fluid assembly according to claim 3, wherein the support is retained on the removable cap.

7. (Once Amended) A fluid filter assembly according to claim 1, wherein the filter element is annular and the support includes an annular end wall extending around one end of the filter element, the annular end wall closing the drain outlet and the loading element loading the support axially.

10. (Once Amended) A fluid filter assembly according to claim 8, wherein the valve element is retained on the annular end wall of the support.

11. (Once Amended) A fluid filter assembly according to claim 1, wherein the fluid outlet is disposed adjacent the drain outlet and has a rim protruding into the housing beyond the drain outlet.

#### REMARKS

Applicant respectfully requests that the foregoing amendments be made prior to examination of the present application. The amendments are made to correct multiple dependencies and do not change the scope of the invention.

Respectfully submitted,

Date March 27, 2002

By Michael D. Kaminski

FOLEY & LARDNER  
Customer Number: 22428



22428

PATENT TRADEMARK OFFICE

Telephone: (202) 672-5483

Facsimile: (202) 672-5399

Michael D. Kaminski  
Attorney for Applicants  
Registration No. 32,904

**MARKED-UP VERSION OF AMENDED CLAIMS**

3. (Once Amended) A fluid filter assembly according to claim 1 [or 2], wherein the housing comprises a base and a removable cap fitted together, the drain outlet being formed in the base.

5. (Once Amended) A fluid assembly according to claim 3 [or 4], wherein the support is retained on the removable cap.

7. (Once Amended) A fluid filter assembly according to [any one of the preceding claims] claim 1, wherein the filter element is annular and the support includes an annular end wall extending around one end of the filter element, the annular end wall closing the drain outlet and the loading element loading the support axially.

10. (Once Amended) A fluid filter assembly according to claim 8 [or claim 9], wherein the valve element is retained on the annular end wall of the support.

11. (Once Amended) A fluid filter assembly according to [any one of the preceding claims] claim 1, wherein the fluid outlet is disposed adjacent the drain outlet and has a rim protruding into the housing beyond the drain outlet.

PUBLISHED 27 MAR 2002

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FILTER ASSEMBLY WITH DRAIN OUTLET

The present invention relates to a fluid filter assembly for filtering a fluid using a filter element mounted on a support in a housing between a fluid inlet and fluid out formed in the housing. In particular, the present invention relates to the provision of a drain outlet in the housing.

The present invention may be applied to an oil filter assembly, for example of the type used in a combustion engine. In such an assembly, the filter element is typically in the form of a corrugated sheet formed into an annulus and mounted on a support including annular end walls extending around respect ends of the filter element.

It is known to provide such a filter assembly with a drain outlet which has the purpose of draining oil from the housing when the filter element is replaced. Typically, the drain outlet will be connected to a sump such as an oil pan in the case of a conventional combustion engine.

In known structures, the drain outlet is provided with a valve to prevent loss of oil during normal use of the filter assembly. Typically the valve is arranged in a machined bore and has numerous metal and/or plastic parts arranged to close the outlet using a ball bearing. Such a drain outlet valve is therefore difficult and expensive to manufacture. Furthermore, the location of the drain outlet valve at the bottom of the housing is disadvantageous as contaminants and sludge in the oil tend to collect and over time cause clogging or damage to the valve. It is physically difficult to clean or replace the valve given its location. The present invention is intended to improve the drain outlet arrangement.

According to the present invention, there is provided a fluid filter assembly comprising:

- a housing having an fluid inlet and a fluid outlet; and
- a filter element mounted on a support within the housing between the fluid inlet and the fluid outlet,

wherein the housing has a drain outlet closed by the filter element support and the fluid filter assembly further comprises a <sup>resilient</sup> loading element loading the support

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against the drain outlet.

Accordingly, on removal of the filter element and the support, the drain outlet is opened and the residual oil in the housing is allowed to drain. As a result of using the filter element support to close the drain outlet, it is not necessary to provide  
5 a separate valve within the drain outlet. Therefore the cost and difficulty of manufacture of such a drain outlet valve are avoided. Similarly, the problems of such a drain outlet valve clogging or being damaged are avoided.

The <sup>resilient</sup> loading element loading the support against the drain outlet is effective to close the drain outlet tightly. This avoids the need to provide the filter element  
10 support with a tight fit within the housing which would create difficulties in manufacture given the small tolerances required and would introduce difficulties in insertion and removal of the filter element.

In addition, the <sup>resilient</sup> loading element can be used to load sealing faces of the support which seal the filter element between the fluid inlet and the fluid outlet.  
15 Therefore, the <sup>resilient</sup> loading element can be provided with the additional purpose of effecting a tight seal for the filter element as well as tightly closing the drain outlet and hence be given a dual-purpose.

~~Preferably, the loading element is a resilient loading element.~~ /

The present invention may be advantageously applied to a conventional type  
20 of filter assembly in which the housing comprises a base and a removable cap fitted together, the drain outlet being formed in the base. In such an assembly, the cap may be removed to allow replacement of the filter element. Conveniently the loading element is provided between the support and the cap.

Desirably, the support is retained on the removable cap. As a result, when  
25 the cap is removed, the filter element and support are also removed by virtue of being retained on the cap, which in turn causes opening of the drain outlet to allow draining of the fluid.

Advantageously, the support has a retaining portion protruding from the support and engaging the cap, and the loading element is a coiled spring, the coils of  
30 which encircle the retaining portion. This provides a compact structure for the loading element and retaining portion.

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The present invention may advantageously be applied to a filter assembly employing a conventional filter element which is annular and has a support including an annular end wall extending around one end of filter element. In this case, the annular end wall may be used to close the drain outlet. Thus, the present invention  
5 may be applied using the annular end wall as a face to close the drain outlet, this being is a portion of the filter element support which would be present in any event, thereby avoiding the need to form the support with additional structural elements. The annular end wall is suitable for closing the drain outlet as it is typically flat in order to cover and to conform to the annular edge of the filter element.

10 Furthermore, the present invention may be applied where the annular end wall of the support has a resilient annular valve element which constitutes a non-return valve across the inlet. In this case, the resilient annular valve element may be used to seal the drain outlet. Thus, an element of the support which is already present for one purpose may be provided with the additional function of closing the  
15 drain outlet without the need to provide any additional structural elements. Furthermore, being resilient, typically made of rubber, the resilient annular valve element provides a good seal to the drain outlet by its very nature.

Where the annular valve element comprises a base portion disposed adjacent the annular end wall of the support and a resiliently flexible flap extending the base  
20 portion to close the fluid inlet and constitute the non-return valve, then preferably the base portion seals the drain outlet. This enhances the seal provided by the valve element, because the base portion is reinforced by the annular end wall of the support adjacent against which it is disposed.

Preferably, the valve element is retained on the annular end wall of the  
25 support. Accordingly, the seal is inevitably replaced together with the filter element. This is advantageous because the annular valve element is regularly replaced, before it degrades and allows leakage through the drain outlet.

Preferably, the fluid outlet is disposed adjacent the drain outlet and has a rim protruding into the housing beyond the drain outlet. This is advantageous because it  
30 allows the fluid to drain out though the drain outlet in preference to the fluid outlet, therefore preventing unfiltered fluid from leaking out of the fluid outlet.



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A fluid filter assembly which embodies the present invention will now be described by way of non-limitative example with reference to the accompanying drawings in which:

Fig. 1 is a cross-sectional side view through the centre of the fluid filter assembly; and

Fig. 2 is a cross-sectional top view of the housing of the fluid filter assembly along line II-II of Fig. 1 with both the filter element and port being removed.

The fluid filter assembly comprises a filter element 1 disposed in a housing 2 formed by a base 3 and a cap 4. The base 3 comprises an end wall 5 and a generally cylindrical wall 6 upstanding from the end wall 5 and formed with an internal thread 7 at the end of the cylindrical wall 6 distal from the end wall 5.

The cap 4 comprises an end wall 8 and a generally cylindrical wall 9 extending therefrom with an external thread 8 at its distal end which screws into the internal thread 11 of the base 3 to releasably fit the cap 3 and base 4 to form the housing 2. Alternatively, instead of screw thread any means may be provided for releasably securing the cap 3 to the base 4, for example a bayonet fitting 4 or any other conventional means.

An O-ring seal 10 is disposed in an external groove in the cylindrical wall 9 of the cap 3 to seal against the cylindrical wall 6 of the base 3.

The base 3 and cap 4 may be formed of aluminium, another metal or preferably of a plastics material. The walls 5, 6, 8 and 9 of the housing 2 together define a cavity in which the filter element is disposed.

The filter element 1 is a corrugated sheet of any suitable material such as paper or a paper-like material, formed into an annulus. A first annular end wall 12 and a second annular end wall 13 are secured to respective axial ends of the filter element 1. The filter element 1 together with the end walls 12 and 13 have a tight push-fit over a generally cylindrical core 14 to abut an annular shoulder 15 formed around the core 14. Consequently, the core 14 and the annular end walls 12 and 13 together constitute a support for the filter element 1 which is disposed within the housing axially within the cylindrical walls 6 and 9. The core 14 is formed with a plurality of apertures 34 to allow the filtered fluid passing through the filter element

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1 into the centre of the core 14.

The core 14 and hence the filter element 1 and the end walls 12 and 13 are retained on the cap by a plurality of axial projections 16 circumferentially spaced around the core 14, each with a radially outwardly extending lip 17 and together  
5 constituting a retaining portion. The cap 4 is formed with a plurality of projections 18 extending axially from the end wall 8 of the cap 4 and spaced circumferentially around the outside of the projections 16 of the core 14. The projections 18 of the cap 4 each have an inwardly extending lip 19 which radially overlap the lips 17 on the projections 16 of the core 14. Accordingly, engagement between the lips 17 and 19  
10 retains the core 14 on the cap 4 when it is removed from the base 3 whilst allowing some relative axial movement between the core 14 and the cap 4.

As a result of the gaps between the two sets of projections 16 and 18, during manufacture it is easy to fit the core 14 to the cap 4 by forcing the core 14 onto the cap 4 and radially deflecting either or both sets of projections 16 and 18 to allow the  
15 lips 17 and 19 to pass.

Arranged within the core 14 at the end nearest the cap 4 is a conventional over-pressure valve constituted by a valve member 20 engaged by hooked arms 21 to a valve spring 22 held by an annular flange 23 projecting internally from the core 14.

A coiled spring 33 is disposed between the cap 4 and the core 14 with its  
20 coils encircling the projections 16 of the core 14. The spring 33 acts as a resilient loading element to bias the core 14 axially of the filter element 1 away from the cap 4 by engaging the shoulder 15 formed on the core 14. Although a spring is preferred, any resilient loading element may alternatively be used, for example a metal press. ~~Alternatively, a weight could be provided as a loading element to bias the core~~  
25 ~~downwardly in use.~~

The end wall 5 of the base 3 is formed with a fluid outlet 24 disposed in the centre of the end wall 5 with its rim 25 projecting into the core 14 through the centre of the first annular end wall 12. A circular wall 26 is upstanding on the end wall 5 of the base 3 encircling the fluid outlet 24 of the base. A fluid inlet 27 extends through  
30 the end wall 5 of the base 3 outside the circular wall 26. The fluid inlet 27 is formed in this instance by three openings as show in Fig. 3, but any number of openings may

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be provided.

A drain outlet 31 extends through the end wall 5 of the base 3 and opens into the housing 2 through a widened portion 32 of the circular wall 26. The drain outlet 31 is connected to a sump, such as the oil pan where the filter assembly is used in a combustion engine.

A resilient valve element 28 in the form of an annular ring made of rubber or any other suitable material is adjacent the first annular end wall 12. The valve element 28 is retained on the first annular end wall 12 by an overhanging annular lip 35 formed on the inner periphery of the annular end wall 12. The valve element 28 comprises a base portion 29 disposed adjacent the first annular end wall 12 and a resiliently flexible flap 30 extending from the base portion 29 at an angle. The base portion 29 of the valve element 28 abuts the circular wall 26 of the base portion 5, and widened portion 32 of the circular wall 26 across the drain outlet 31.

The spring 33 loads the first annular end wall 12 against the circular wall 26, so that the first end wall constitutes a sealing face between the fluid inlet 27 and the fluid outlet 24 with the base portion 29 of the valve member 28 acting as a sealing element therebetween. The spring 33 also loads the first annular end wall 12 against the widened portion 32 of the circular wall 26 so that the annular end wall 12 closes the drain outlet 31, with the base portion 29 of the valve element 28 acting as a sealing element for the drain outlet 31. Also, the spring 33 loads the shoulder 15 against the second annular end wall 13 which therefore acts as another sealing face between the fluid inlet 27 and the fluid outlet 24.

The flap 30 of the valve element 28 seals against the end wall 5 of the base 3 outside the fluid inlet 27 to close the fluid inlet 27. Pressure in the fluid inlet 27 causes the flap 30 to flex outwardly allowing fluid into the housing 2 so that the flap 30 constitutes a non-return valve.

When the cap 4 is removed from the base 3, the filter element 1 and its support are removed at the same time, because they are retained by the projection 16 and 18 is removed at the same time. The valve element 28 is also removed because it is retained by the annular lip 35. Such removal opens the drain outlet 31 and allows the oil within the housing to drain away. As a result of the rim 25 of the fluid outlet 24 protruding into the housing 2 further than the adjacent drain outlet 31, excess fluid

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drains out of the drain outlet 31 without leaking into the fluid outlet 24.

Subsequently, on replacement of a new filter, the annular end wall 12 of the support of the new filter element 1 closes the drain outlet 31 and sealing thereof is provided by a new valve element 28.

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CLAIMS

1. A fluid filter assembly comprising:
- 5 a housing having an fluid inlet and a fluid outlet; and
- a filter element mounted on a support within the housing between the fluid inlet and the fluid outlet,
- wherein the housing has a drain outlet closed by the filter element support and the fluid filter assembly further comprises a <sup>resilient</sup> loading element loading the support
- 10 against the drain outlet.

~~2. A fluid filter assembly according to claim 1, wherein the loading element is a resilient loading element.~~

- 15 <sup>2</sup> 3. A fluid filter assembly according to claim 1 ~~or 2~~, wherein the loading element also loads sealing faces of the support which seal the filter element between the fluid inlet and the fluid outlet.

- <sup>3</sup> 4. A fluid filter assembly according to <sup>claim 1 or 2,</sup> ~~any one of the preceding~~ claims, wherein the housing comprises a base and a removable cap fitted together, the drain outlet being formed in the base.
- 20

- <sup>4</sup> 5. A fluid filter assembly according to claim <sup>(3)</sup> ~~4~~ when appendant to claim ~~2~~, wherein the resilient loading element is provided between the support and
- 25 the cap.

- <sup>3 4</sup> 6. A fluid filter assembly according to claim ~~4~~ or ~~5~~, wherein the support is retained on the removable cap.

- 30 <sup>5</sup> 7. A fluid filter assembly according to claim ~~6~~, wherein the support has a retaining portion protruding from the support and engaging the cap, and the

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loading element is a coiled spring, the coils of which encircle the retaining portion.

7 9. A fluid filter assembly according to any one of the preceding claims, wherein the filter element is annular and the support includes an annular end wall extending around one end of the filter element, the annular end wall closing the drain outlet and the loading element loading the support axially.

8 10. A fluid filter assembly according to claim 9, wherein the annular end wall of the support has a resilient annular valve element adjacent thereto which constitutes a non-return valve across the fluid inlet and which seals the drain outlet.

9 11. A fluid filter assembly according to claim 10, wherein the annular valve element comprises a base portion disposed adjacent the annular end wall of the support, the base portion sealing the drain outlet, and a flexible flap extending from the base portion to close the fluid inlet and constitute the non-return valve.

10 12. A fluid filter assembly according to claim 10 or 11, wherein the valve element is retained on the annular end wall of the support.

20 11 13. A fluid filter assembly according to any one of the preceding claims, wherein the fluid outlet is disposed adjacent the drain outlet and has a rim protruding into the housing beyond the drain outlet.

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International Bureau



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5 April 2001 (05.04.2001)

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Stephen [GB/GB]; 11 Woodfield Road, Talbot Green, Mid  
Glamorgan CF7 8JF (GB).

(21) International Application Number: PCT/GB00/03607

(74) Agent: **MERRYWEATHER, Colin, Henry**; J.A. Kemp  
& Co., 14 South Square, Gray's Inn, London WC1R 5LX  
(GB).

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9923064.1 29 September 1999 (29.09.1999) GB

(71) Applicant (*for all designated States except US*): **FRAM  
EUROPE LIMITED** [GB/GB]; Llantrisant Industrial Es-  
tate, Llantrisant, Pontyclun, Glamorgan CF7 8YU (GB).

Published:

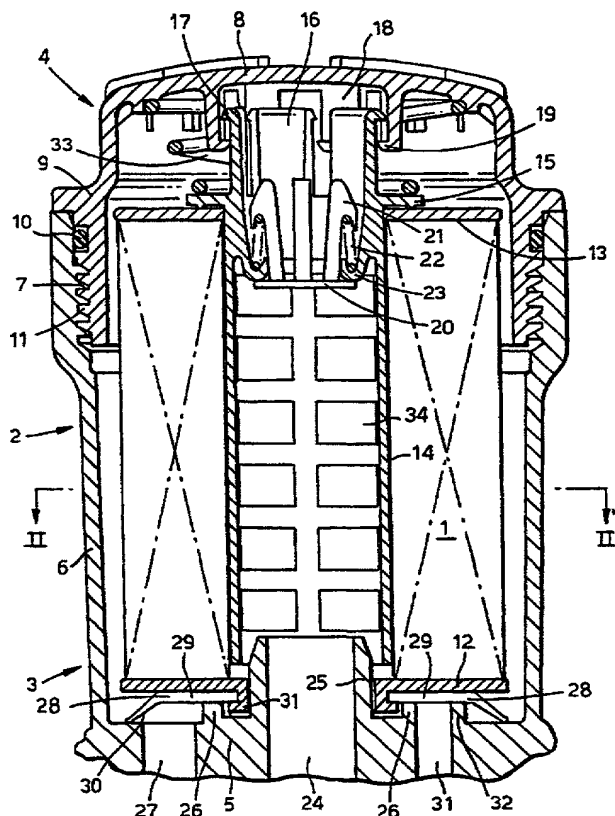
— With international search report.

(72) Inventor; and

(75) Inventor/Applicant (*for US only*): **MULES, Robert**,

*For two-letter codes and other abbreviations, refer to the "Guid-  
ance Notes on Codes and Abbreviations" appearing at the begin-  
ning of each regular issue of the PCT Gazette.*

(54) Title: **FILTER ASSEMBLY WITH DRAIN OUTLET**



(57) Abstract: A fluid filter assembly for filtering a fluid, such as oil in a combustion engine. The fluid filter assembly comprises a housing (2) having a fluid inlet (27) and a fluid outlet (24); and a filter element (1) mounted on a support (12, 13, 14) within the housing between the fluid inlet (27) and the fluid outlet (24). The housing (2) also has a drain outlet (31). The filter element is annular (1) and includes an annular end wall (12) extending around one end of the filter element (1). The annular end wall (12) closes the drain outlet (31). The filter element support (12, 13, 14) is retained on a removable cap (4) which is fitted to a base, together constitute the housing (2). A resilient loading element in the form of a spring (33) biases the support (12, 13, 14) against the drain outlet (31) and loads the sealing faces of the support (12, 13, 14) which seal the filter element (1) between the fluid inlet (27) and the fluid outlet (24). The annular end wall (12) of the support has a resilient annular valve element (28) comprising a base portion (29) disposed adjacent the annular end wall (12) which seals the drain outlet (31) and a flap (30) extending from the base portion (29) to close the fluid inlet (27) and constitute a non-return valve.

WO 01/23068 A1

Fig.1.

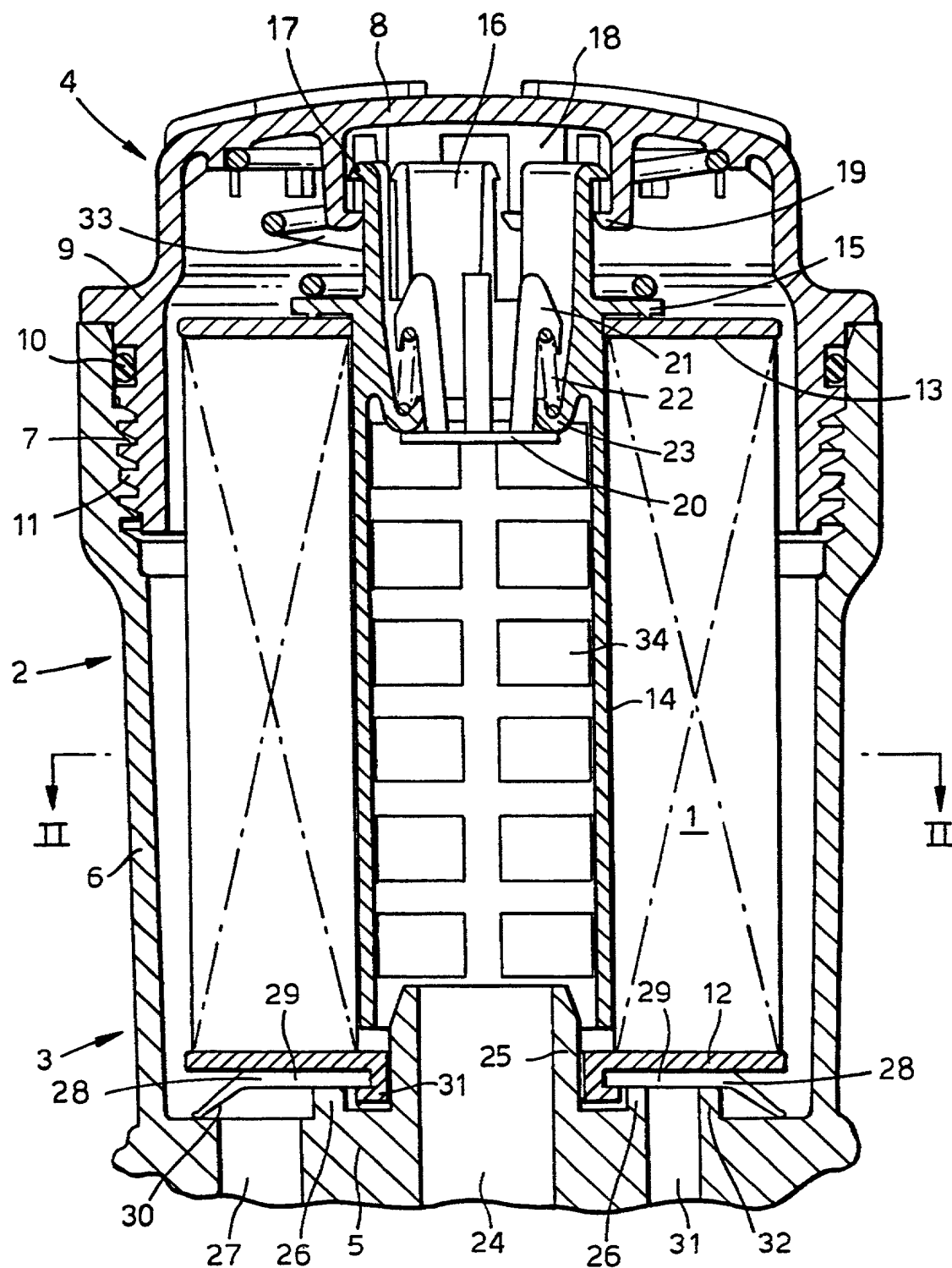
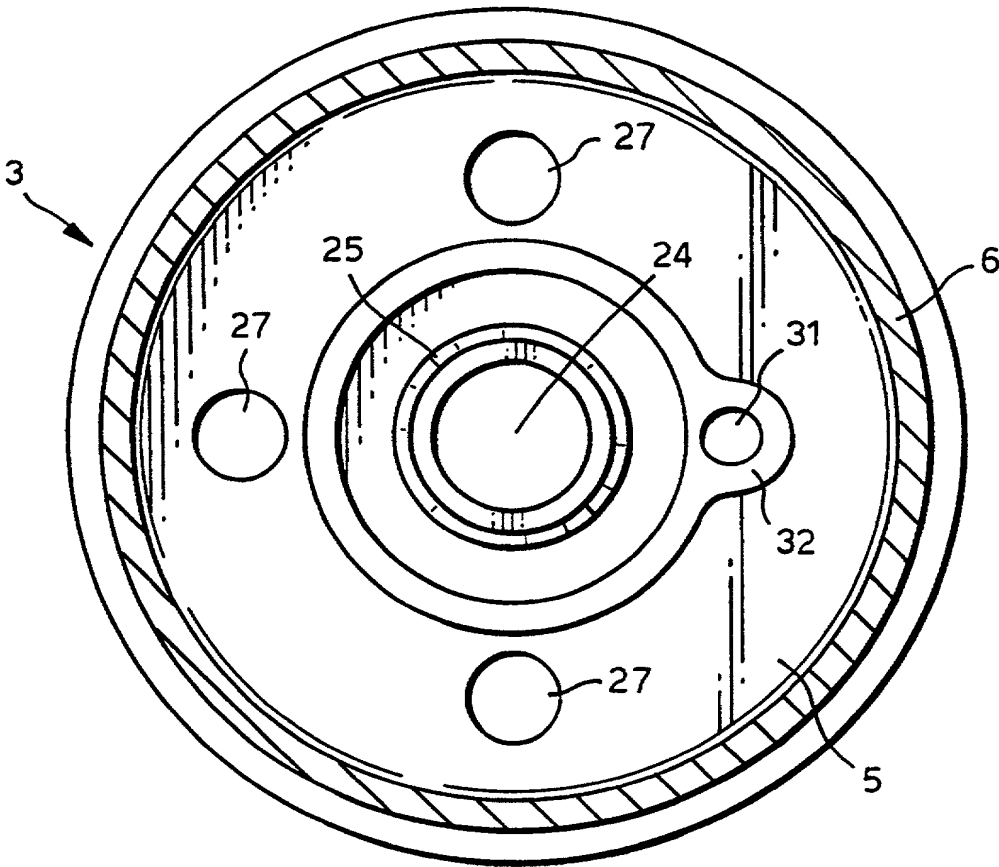




Fig.2.



DECLARATION AND POWER OF ATTORNEY

As below named inventor, I HEREBY DECLARE:

THAT my residence, post office address and citizenship are as stated below next to my name;

THAT I believe I am the original, first and sole inventor (if only one inventor is named below) or an original, first and joint inventor (if plural inventors are named below or in an attached Declaration) of the subject matter which is claimed and for which a patent is sought on the invention entitled:

**FILTER ASSEMBLY WITH DRAIN OUTLET**

---

(Attorney Docket No.)

---

the specification of which (check one)

☐ is attached hereto.

☐ was filed on **20 Sep 2000** as United States Application Number or  
PCT International Application Number **PCT/GB00/03607** and was amended  
on \_\_\_\_\_ (if applicable).

THAT I do not know and do not believe that the same invention was ever known or used by others in the United States of America, or was patented or described in any printed publication in any country, before I (we) invented it;

THAT I do not know and do not believe that the same invention was patented or described in any printed publication in any country, or in public use or on sale in the United States of America, for more than one year prior to the filing date of this United States application.

THAT I do not know and do not believe that the same invention was first patented or made the subject of an inventor's certificate that issued in any country foreign to the United States of America before the filing date of this United States application if the foreign application was filed by me (us), or by my (our) legal representatives or assigns, more than twelve months (six months for design patents) prior to the filing date of this United States application;

THAT I have reviewed and understand the contents of the above-identified specification, including the claims, as amended by any amendment specifically referred to above;

THAT I believe that the above-identified specification contains a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the invention, and sets forth the best mode contemplated by me of carrying out the invention; and

THAT I acknowledge the duty to disclose to the U.S. Patent and Trademark Office all information known by me to be material to patentability as defined in Title 37, Code of Federal Regulations, §1.56.

I HEREBY CLAIM foreign priority benefits under Title 35, United States Code, §119(a)-(d) or §365(b) of any foreign application(s) for patent or inventor's certificate, or §365(a) of any PCT international application which designated at least one country other than the United States of America, listed below and have also identified below any application for patent or inventor's certificate or of any PCT international application having a filing date before that of the application on which priority is claimed.

Prior Foreign Application Number	Country	Foreign Filing Date	Priority Claimed?	Certified Copy Attached?
<b>9923064.1</b>	<b>the United Kingdom</b>	<b>29 Sep 1999</b>	<b>Yes</b>	

I HEREBY CLAIM the benefit under Title 35, United States Code, §119(e) of any United States provisional application(s) listed below.

U.S. Provisional Application Number	Filing Date

I HEREBY CLAIM the benefit under Title 35, United States Code, §120 of any United States application(s), or §365(c) of any PCT international application designating the United States of America, listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States or PCT International application in the manner provided by the first paragraph of Title 35, United States Code, § 112, I acknowledge the duty to disclose information material to patentability as defined in Title 37, Code of Federal Regulations §1.56 which became available between the filing date of the prior application and the national or PCT international filing date of this application.

U.S. Parent Application Number	PCT Parent Application Number	Parent Filing Date	Parent Patent Number
	<b>PCT/GB00/03607</b>	<b>20 Sep 2000</b>	

I HEREBY APPOINT the following registered attorneys and agents of the law firm of FOLEY & LARDNER:

STEPHEN A. BENT	Reg.No.	29,768
DAVID A. BLUMENTHAL	Reg.No.	<u>26,257</u>
BETH A. BURROUS	Reg.No.	<u>35,087</u>
ALAN I. CANTOR	Reg.No.	<u>28,163</u>
WILLIAM T. ELLIS	Reg.No.	<u>26,874</u>
JOHN J. FELDHAUS	Reg.No.	<u>28,822</u>
MICHAEL D. KAMINSKI	Reg.No.	<u>32,904</u>
LYLE K. KIMMS	Reg.No.	<u>34,079</u>
KENNETH E. KROSIN	Reg.No.	<u>25,735</u>
JOHNNY A. KUMAR	Reg.No.	<u>34,649</u>
JACK LAHR	Reg.No.	<u>19,621</u>
GLENN LAW	Reg.No.	<u>34,371</u>
PETER G. MACK	Reg.No.	<u>26,001</u>
STEPHEN B. MAEBIUS	Reg.No.	<u>35,264</u>
BRIAN J. MCNAMARA	Reg.No.	<u>32,789</u>
SYBIL MELOY	Reg.No.	<u>22,749</u>
RICHARD C. PEET	Reg.No.	<u>35,792</u>
GEORGE E. QUILLIN	Reg.No.	<u>32,792</u>
ANDREW E. RAWLINS	Reg.No.	<u>34,702</u>
BERNARD D. SAXE	Reg.No.	<u>28,665</u>
CHARLES F. SCHILL	Reg.No.	<u>27,590</u>
RICHARD L. SCHWAAB	Reg.No.	<u>25,479</u>
MICHELE M. SIMKIN	Reg.No.	<u>34,717</u>
HAROLD C. WEGNER	Reg.No.	<u>25,258</u>

to have full power to prosecute this application and any continuations, divisions, reissues, and reexaminations thereof, to receive the patent, and to transact all business in the United States Patent and Trademark Office connected therewith.

I request that all correspondence be directed to:

FOLEY & LARDNER  
Washington Harbour  
3000 K Street, N.W., Suite 500  
Washington, D.C. 20007-5109

Telephone: (202) 672-5404  
 Facsimile: (202) 672-5399

I UNDERSTAND AND AGREE THAT the foregoing attorneys and agents appointed by me to prosecute this application do not personally represent me or my legal interests, but instead represent the interests of the legal owner(s) of the invention described in this application.

I FURTHER DECLARE THAT all statements made herein of my own knowledge are true, and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardise the validity of the application or any patent issuing thereon.

20/2207-604001

Name of first Inventor	<u>MULES Robert Stephen</u>
Residence	<u></u>
Citizenship	<u>X BRITISH</u>
Post Office Address	<u>11 Woodfield Road Talbot Green Mid Glamorgan CF7 8JF the United Kingdom</u>
Inventor's Signature	<u>X <i>[Signature]</i></u> X
Date	<u>X 4th MARCH 2002</u> X